JUL 24 1924

No. 4. Vol. XVII. April, 1924.

The ILLUMINATING ENGINEER

ELECTRICITY · ACETYLENE · OIL · GAS

Edited by LEON GASTER

18/- Yearly. THE JOURNAL OF SCIENTIFIC ILLUMINATION. 1/6 a Copy.

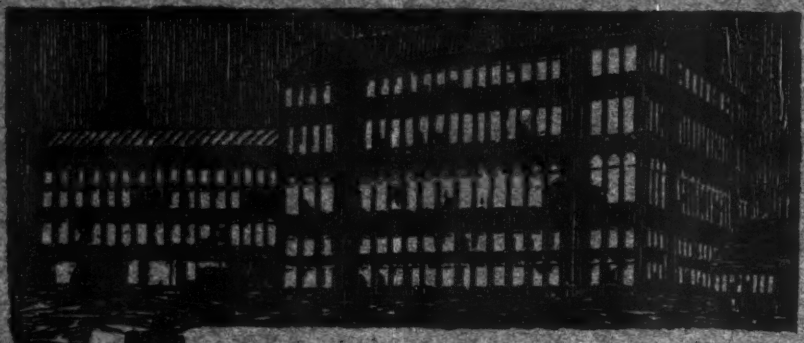
OFFICIAL ORGAN OF THE
Illuminating Engineering Society.
(Founded in London 1909.)

ILLUMINATING ENGINEERING PUBLISHING COMPANY, LTD.
32, VICTORIA STREET, LONDON, S.W.1
(TEL. NO. VICTORIA 5215.)

This number contains the papers read by MR. G. P. GARBETT and MISS M. PARTRIDGE on **"The Use of Light in Modern Advertising"** at the Meeting of The Illuminating Engineering Society on March 21st, 1924, and the ensuing discussion.

Other matters dealt with include:

THE REPORT OF THE NATIONAL ILLUMINATION COMMITTEE FOR 1923—STANDARDS OF ILLUMINATION FOR INDUSTRIAL LIGHTING—THE LIGHTING OF A FOOTBALL GROUND, ETC.



THE GAS LIGHT AND COKE COMPANY

will be happy at any time to co-operate fully with any Member of The Illuminating Engineering Society in the planning of the lighting of any room or building situated within their area of supply, and in making any experiments in connection therewith to the end of ensuring its illumination on scientific and practical lines.

Communications addressed to the Chief Office, Horseferry Road, Westminster, S.W.1, and mentioning "The Illuminating Engineer," will receive special attention.

The
ELECTRICITY · ACETYLENE · OIL · GAS
ILLUMINATING ENGINEER
Edited by
LEON GASTER

THE JOURNAL OF SCIENTIFIC ILLUMINATION.

OFFICIAL ORGAN OF THE

Illuminating Engineering Society.

(Founded in London, 1909.)

ILLUMINATING ENGINEERING PUBLISHING COMPANY, LTD.

32, VICTORIA STREET, LONDON, S.W.1.

Tel. No. Victoria 5215.

EDITORIAL.

The Use of Light in Modern Advertising.

The Use of Light as an Aid to Publicity was the subject of discussion before the Illuminating Engineering Society in 1920. This, however, is a subject which is in a state of continual development. New devices are constantly making their appearance so that the topic is one that may with advantage be taken up every few years. The discussion before the Illuminating Engineering Society on March 21st, 1924, was therefore timely. The problem being a wide one it was found expedient to divide the subject into two headings. Mr. G. P. Garbett read a paper on "The Use of Light for Outdoor Advertisements," in the course of which many striking examples of animated signs, both in this country and abroad, were given.

Miss M. Partridge dealt with "The Use of Light in Shops, Show-windows, and for Display Purposes," referring mainly to shop-window lighting, but also giving some account of the new neon signs. We may mention that this is the first time when a lady has read a paper before our Society, and we welcome this illustration of the interest taken by the members of the Women's Engineering Society in illuminating engineering.

Several speakers referred to possible explanations of the fact that illuminated signs are less used in London than in some Continental and American cities. It has been suggested that natural habits and climatic conditions have an important bearing on this question. In the uncertain climate of northern latitudes people are less inclined to spend their evenings

in the streets. Early forms of legislation have also been mentioned as a possible explanation of the slower development. As indicated in Mr. Garbett's paper, this is not to be entirely regretted, as the restraining influence of public opinion has saved us from obtrusive uses of light on a large scale; while in the more artistic and better conceived forms of illuminated signs this country may freely claim to have held its own. It is evident, however, that the whole subject needs to be surveyed from several viewpoints—that of the advertisers, the maker of illuminated signs, and the public.

In the discussion several speakers mentioned instances of signs which have obviously failed, in spite of their brilliancy, to fulfil the intention of the advertiser. Sometimes one can ascertain the obvious cause for failure; for example, imperfect spacing of letters, or too intricate design. But in others the inherent defect is less evident, and it may be suggested that the aid of the psychologist would be of considerable value in explaining how an appeal to the public is best conveyed. On one point most people are agreed, that a sign that "startles rather than attracts" rarely constitutes an effective advertisement. There is plenty of room for originality and ingenuity in illuminated signs coupled with good taste. Mere brilliancy, besides being objectionable, is a possible danger to traffic, and of doubtful value from the advertisers' standpoint as it is open to any advertiser to "kill" a neighbouring sign by the brilliancy of his own. Hence, advertisers should have some kind of working agreement in order to ensure that their displays do not clash.

As regards the tendency in design, we were glad to note the growing recognition of the value of pictorial and other devices illuminated by concealed sources of light, in preference to the display of unscreened filaments. It may sometimes be difficult to convince advertisers that they obtain better value from this form of sign; but in future we believe that experience in regard to shop-window lighting will be repeated in the case of signs, and that "light on the object, not in the eye" will become the approved principle in cases where the actual source, behind translucent material, form the object viewed, a mild luminosity, coupled with originality in colour scheme and design, will be found most effective. It is, however, evident that the choice of signs must depend materially on the nature of the surroundings and the district in which they are to be used. Whilst there are many rules governing the details of erection of signs, there is no general understanding amongst authorities on what is really an important factor—the permissible brightness. On this point interchange of views, in order to arrive at a few fundamental principles, would be useful.

Reference was made by Mr. Garbett to the great variety and complexity of regulations for outdoor signs in use in large cities. It can scarcely be doubted that some of these are obsolete and require revision, and that there is no real justification for the capricious and variable regulations enforced by different authorities. It is only right and proper that local authorities representing the public should have some control over the nature of signs put up in the streets; but it should be possible to frame simple regulations for acceptance throughout the country. We think, therefore, that the time is now ripe for a conference between those representing all aspects of the subject, and no doubt the Joint Committee which the Illuminating Engineering Society proposes to appoint to deal with the matter will pave the way for mutual understanding, and more practical regulations affecting the use of light for purposes of advertising.

The Maintenance of Good Lighting.

Careful attention is often given to the design of a lighting installation, and in many modern offices and factories very good results are obtained; but it is not always realised that the mere provision of a satisfactory installation is not enough, it is also necessary to keep it in good condition. In general people realise the necessity for regular cleaning of windows to admit natural light, even though the cleaning of a large glass area may set a limit to the frequency with which this can be done. It is surely reasonable to suggest that lamps and fittings furnishing artificial lighting should receive similar attention.

A few years ago tests were published showing how two or three months' neglect may cause a loss of illumination of 30 per cent. or even more. This figure is fully confirmed by a very comprehensive number of tests summarised by Messrs. E. A. Anderson and J. M. Ketch in the *Transactions of the American Illuminating Engineering Society.** A series of lighting units of various types were mounted in several different localities, the illumination was measured at regular intervals, the lamps being burned for two 2-hour periods per day. Specially seasoned lamps which would not age appreciably throughout the test were selected. Accordingly any diminution in illumination might be ascribed to deposits of dust and dirt. From this series of tests a number of interesting results emerge. In one area 120 days' exposure to dry fine dust resulted in a loss of light varying from 11 to 27 per cent. in the case of direct lighting units and from 10 to 33 per cent. with indirect units. In another district where the dust was oily and sooty only 49 days sufficed to cause losses varying from 10 to 35 per cent. with direct units. With semi-indirect units of the open type losses at least 50 per cent. greater were recorded. In the case of the simple open bowl the loss was as great as 50 per cent. during the 49 days' period.

While it is admitted that in general the indirect and semi-indirect units are more subject to dirt than direct units, much depends on the design. Some forms of semi-indirect fittings appear to stand the effects of dust very well. In this connection there is one very interesting point—the effect of a bottom vent hole. Special tests showed that the depreciation was 50 per cent. greater, and even more in the case of a globe with the bottom vent, as compared with the sealed globe. It appears that the upward current of air through the aperture causes a filtration of dirt into the interior, and in some cases about half of the depreciation is due to the dirt on the inside of the fitting. This result was fully confirmed by the experiments on outdoor lighting units. It is only possible to give an indication of some of the chief conclusions to be derived from these useful series of tests. But they completely confirm the importance of regular maintenance and cleaning. Incidentally we may refer to another conclusion arrived at by the authors, viz., that wiping lamps and reflectors with a dry cloth removes only one-half to two-thirds of the dirt and dust that is taken off when a damp cloth is used. In other words, the cleaning, besides being regular, must be thorough.

* January, 1924, pp. 55–66.

Proposed Standards of Illumination in Factories.

In the considerable amount of discussion that has recently taken place on the subject of industrial lighting it is usually the intensity of illumination that excites most interest—although, as we have often pointed out, this is only one of many problems to be considered.

In judging the amount of illumination we have to be clear in our minds on the purpose it is intended to serve. The primary function is to safeguard the health and safety of the operator. The Home Office Departmental Committee early recognised this fact by proposing minimum values, easily complied with in practice, as a measure of safety, but irrespective of the illumination necessary for the efficient carrying on of work. In their third report they presented the now familiar schedule of industrial operations classified as " fine " (requiring not less than 3 foot-candles) and " very fine " (requiring not less than 5 foot-candles) but made it clear that these values were not intended to serve as legal minima, but only as an indication of the minimum illumination desirable in practice in order that work might be done with reasonable ease and comfort.

A clear distinction must be drawn between legal minima and recommendations. Managers of factories, in their own interests, might often find it expedient to adopt values much higher than 3 or 5 foot-candles. But the extent to which they would benefit by this increase naturally depends on the nature of the work and the possibilities of improved production.

It is interesting to observe that experience in the United States is now confirming the view taken in this country regarding the fixing of standards. In the latest code of the Department of Labour and Industries in the State of Washington, which became effective on January 1st, 1924, three distinct values of illumination are set out. There is, firstly, the " Minimum Permissible Foot-candles on the Space or at the Work " (ranging from 0·2 foot-candle for yards to 5 foot-candles for processes involving discrimination of minute detail). The intensities listed in this column specify the lowest illumination with which workmen can work with safety. Next there is the " Recommended Intensity of Good Practice " (ranging from 0·5-1 to 7-10 foot-candles), *i.e.*, those employed in well-lighted modern factories where the aim has been to reduce eyestrain to a minimum. Thirdly, we have " Recommended Productive Intensities " (ranging from 5 to 20 or more foot-candles), to be employed in factories where the management aims at securing the maximum of production and minimum of spoilage.

We see here the inevitable discrimination between values serving as legal minima and foot-candles recommended as good working practice (which figures have been considerably reduced as compared with those in previous codes in other states).

According to the view of the writer, now widely accepted, *minimum legal standards of illumination* should be based primarily on considerations of safety and health. Supplementary *recommendations*, serving as an indication of good practice, should only be fixed after consultation, where possible, with the joint councils of the industries concerned. Finally the economic value of increased illumination should receive due consideration and, where justified, higher values of illumination may be recommended in the interests of efficient production.

LEON GASTER.

TRANSACTIONS

OF

The Illuminating Engineering Society.

(Founded in London, 1909.)

The Illuminating Engineering Society is not, as a body, responsible for the opinions expressed by individual authors or speakers.

THE USE OF LIGHT IN MODERN ADVERTISING.

(Proceedings at the meeting of the Illuminating Engineering Society, held at the House of the Royal Society of Arts, 18, John Street, Adelphi, London, W.C., at 8 p.m., on Friday, March 21st, 1924.)

A MEETING of the Society was held at the House of the Royal Society of Arts, 18, John Street, Adelphi, W.C., at 8 p.m. on Friday, March 21st, Mr. J. ECK, presiding.

The minutes of the last meeting having been taken as read the HON. SECRETARY read out the names of applicants for membership, as follows :—

Snelling, F. D.	Gas Inspector, 1, Morley Avenue, Wood Green.
Adcock, W. H.	Technical Engineer, General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.

The CHAIRMAN then called upon Mr. G. P. GARBETT to read his paper on **"The Use of Light for Outdoor Advertisements,"** which was illustrated by many views of typical illuminated signs in London and in American and Continental cities. Miss M. PARTRIDGE then read a paper, also illustrated by lantern slides, on **"The Use of Light in Shops, Show-windows and for Display Purposes."**

In the subsequent discussion Mr. A. E. MOORE, Mr. H. E. HUMPHREYS (Secretary of the Incorporated Society of British Advertisers), Mr. R. A. IVES, Mr. J. W. FIELD, Mr. E. L. RANDALL, Mr. T. E. RITCHIE, Mr. E. A. MARX, Mr. R. W. WHITEY, Mr. J. W. T. WALSH and Mr. L. GASTER took part.

In the course of the discussion several interesting exhibits were arranged, including a demonstration of one of the new Neon signs by Messrs. Siemens and English Electric Co., Ltd.

After a vote of thanks to the lecturers had been proposed by Mr. P. J. WALDRAM and carried with acclamation, The CHAIRMAN announced that the **next meeting** would take place on April 28th, when there would be a discussion on **"The Lighting of Textile Mills."**

A

THE USE OF LIGHT FOR OUTDOOR ADVERTISEMENTS.

By G. P. Garbett.

(Introduction to a Discussion before the Illuminating Engineering Society, held at the House of the Royal Society of Arts, 18, John Street, Adelphi, London, W.C., at 8 p.m., on Friday, March 21st, 1924.)

Although the provisional title of this paper is given as "The Use of Light for Outdoor Advertisement," the field covered by that title is so wide that it would be desirable to somewhat restrict the amount of the present paper. It will be well to confine our attention to the subject of the "Electric Sign" as generally understood by the "man in the street," by which is chiefly meant the visible lamp spectacular display.

The early history of the electric sign has already been discussed before the members of the Society, and for our purpose it will suffice to state that most recorders—even Americans—agree that the first electric sign was built by Major W. J. Hammer in 1882 and erected by him at the International Exhibition at the Crystal Palace. It was erected indoors over the great organ, and consisted of the word EDISON. It was operated by a hand-driven commutator switch to give a letter-by-letter switching effect. In the following year the same gentleman made a second sign for the Health Exhibition at Berlin. This sign also advertised the name EDISON. It was an advance in many respects over the London sign, and was erected outdoors, over the entrance arch of a pavilion. Incidentally, this sign embodied most of the basic principles of the electric sign of to-day. It consisted of special holders mounted on a backboard with the ends protruding through a metal front plate. The lamps had special caps and were fitted with rubber gaskets to keep out the weather as much as possible. A motor-driven flasher operated this sign to give a spelling effect, and the whole installation was controlled by an automatic time switch. Doubtless the whole apparatus would seem crude to present-day eyes, but the fact that in forty years practically no fundamental changes in principle have been recorded is certainly a very fine tribute to the early pioneers in the electric sign field.

From those far-off days the developments of electric signs have largely kept pace with—indeed, they have owed their very being to—improvements in the manufacture of incandescent electric lamps. In this country the early electric signs were fitted with low candlepower carbon filament lamps. It is true to say that their advent gave rise to torrents of criticism and objection from the police, the parochial authorities, and others. One of the chief arguments used against the early builders of signs was that horses would be frightened by the glare, and the intermittent switching on and off of the lights, and that the pedestrians also would be in danger of life and limb by being distracted by these illuminated monstrosities. Again, one cannot desist from remarking that we do not appear to have travelled over far since the early days.

It is interesting to note how these early troubles influenced British design in electric signs operation, and how the absence of similar restrictions in America caused the development there to take quite a different path. It early became manifest that next to the light itself the most important factor in the design of an electrical advertising display was animation. Actually, of course, this animation is only apparent, not real, and is obtained by the switching on and off in definite sequence of lamps or groups of lamps to effect the semblance of writing or spelling of the wording displayed.

In this country, as the lighting or extinguishing of whole letters or words was looked on with disfavour, the ingenuity of the designer evolved many schemes to combine the maximum of attractive animation with the minimum of possible legal interference. At first the script spelling type of sign controller,

or "flasher," was so made that the completion of the spelling of the word or phrase was followed not by total extinction, but rather with a wiping out effect, so as to make the change from light to darkness and back to light again as gradual as possible. Later on startling innovation was made in the use of two or three sets of coloured electric lamps, and instead of changing from light to darkness the transition became from light of one colour to that of another hue. As time went on many effective combinations of colour switching were introduced, and it is quite true to say that until the last three or four years practically all the successful examples of electrical publicity in this country were along the lines of the well-known and extremely effective colour changing "Bovril" and "Schweppes" displays.

In America no such difficulties were encountered by the early designer. There, where commercialism holds undisputed sway over all other considerations, artistic effects and delicate colour-changing schemes found no part in the design, and each sign vies with its predecessor in that unending race for "bigness." The largest possible lettering, the greatest possible number of lamps, the area covered by the sign, and the amount of "punch" that could be put in the display by switching on and off large units of the sign were the factors that distinguished the early American efforts. While it is fair to say that for variety of design, and for the size both of the signs themselves and of the industry which is founded on them, America leads the world to-day, one still feels that the typically British design of the older type compares very favourably with anything of a similar character produced in any other country.

We might now turn to the consideration of those factors which have led up to the development of electric signs of to-day. These might be divided into four headings:—

(1) Construction.
(2) Lamps.
(3) Switchgear.
(4) Restrictions.

Taking the first item, it will be readily conceded that there are, even to-day, signs—and signs. The earliest type of sign might well be called the Flush type. It consisted of a flat background. The lettering was painted thereon, and the lampholders were in turn mounted on the lettering. This sign is full of defects. In the first place, the sign is extremely difficult to read at an angle; all that is seen is a forest of electric lamps. When viewed from the front the effect is nearly as bad, as the light from the lamps is thrown on the background as well as the lettering, resulting in considerable halation and loss of legibility. Strange to say, a sign of this type was erected quite recently in an important Westminster thoroughfare, and to-day serves to show only too well how not to do it.

The next step in design was the making of the individual letters. This was an undoubted advance on the flush type, as it eliminates the lighted background. This type has, however, still a number of defects. The chief is its bad angle readability; the forest of lamps still remains, especially in the smaller letters, and where signs are fitted low down on a building near the normal line of vision this type is very inefficient. Where wooden letters are used the trouble is aggravated by the fact that the bayonet type of holders are employed, and by the nature of their design the lamp projects so far in front of the surface of the letters that at quite a small angle it appears to have lost all sense of attachment to its particular member of the letter. The most glaring example of this type of letter is the half-round gilt wood letter in script characters used by a well-known firm of caterers. Viewed from an angle of 30 feet it is quite unreadable by anyone unfamiliar with the actual wording. It may be remarked here in passing that the bayonet lampholder—excellent as it is for other purposes—has proved very unsatisfactory in outdoor sign work.

These faults are mainly traceable to three points. First, the sticking of the contact plungers owing to corrosion of the brass slider or the rusting of the spring, or both; secondly, the corrosion of the outer brass shell; and thirdly, the prevalence of short circuits owing to the poor protection from the weather,

and the small space and short leakage path between the opposite poles of the contact plungers and the outer casing or lamp cap. These troubles can be minimised to some extent. One of the best-known signmakers uses bayonet holders with phosphor-bronze plunger springs and non-corrosive contacts. Their lampholder shells are made of copper or bronze, and by the use of selected teak for the construction of these letters the holder troubles are largely overcome.

Another of the leading sign constructors has standardised a metal letter which is a distinct improvement in some respects over the older wooden type. This letter has a U-shaped cross-section and is made of vitreous enamelled steel. It is fitted with a porcelain lampholder designed to carry a special screw-capped lamp. Although this holder has certain defects, its design shows a distinctly forward tendency and is an advance on the bayonet holders. The objections to this type of letter from an angle visibility point of view are, of course, just as marked as in the wood type.

The most modern type of sign letter construction embodies the use of the sheet steel channel section letter. The cross-section of this letter is roughly that of an H. It is usually fitted with a lampholder of the procelain block type designed to carry the standard Edison Screw lamps. Provided that the proportions of the width of surface of the letter strokes, the height of the side walls, and other factors are correctly designed, this type of letter has distinct advantages over the flat surface type. The effect of the side walls is to harness the light and to prevent it spilling over the background or the sides of faces of other letters. Perfect legibility is ensured for even unfamiliar shaped letters or characters, when viewed from any point in an extremely wide angle. The lampholder described has considerable advantages over the other types mentioned, not the least being the fact that the Edison Screw-capped lamps are readily procurable.

Lamps.

Undoubtedly the greatest stimulant to the development of the modern electric sign was the introduction of the metal filament lamp. The modern spectacular and flashing effects now produced could not have been accomplished with the old carbon filament lamp, owing to its inherent sluggishness in attaining its full light intensity and its slow fading-out effect when the current was switched off. Most of the effects of running borders, revolving wheels, waving flags, flames, smoke, rockets, etc., are obtained by switching lamps or groups of lamps in such rapid sequence as to deceive the eye. If this speed of switching is reduced below a known critical limit, the illusion of movement is no longer conveyed to the eye. The metal filament lamp reaches maximum brilliancy on switching on and becomes extinct again when switched off at a speed which is—to the human eye—almost instantaneous. This fact alone permits switching to be arranged at speeds requisite to the successful creation of the desired illusion.

In America, where the subject of electric sign design has received more detailed study than here, researches have resulted in tables being produced and equations being evolved to determine the size of lamps to be used in all sorts of circumstances in electric sign work. Such factors as the width of letter stroke, the height, proportions and spacing of the letters, the size, colouring, type and spacing of lamps, all have their effect, and these have been tabulated for guidance of designers. It is well, however, not to take these tables too seriously. Rarely is one asked to design a sign with plain wording only, to be fitted in a space of unlimited dimensions, and to be viewed from some definite maximum distance. More usually some special trade-mark, or characteristic type of letter or some design or animated feature have to be incorporated in the design or, alternatively, the space available will only permit letters or designs of restricted height or width.

One of the foremost American experts has written at some length on the subject of the size of the apparent spot of light from an individual electric lamp when viewed from any given distances. A great deal of useful information can be obtained by a study along these lines, but as the whole effect of our observations

is changed if the light source is partly obscured by the use of opal glass or of lamps with transparent enamel coatings, it will be appreciated that one has to constantly revise their ideas with the progress of lamp manufacture.

Something should be said here as to the lamps themselves. The desirable characteristics in a sign lamp are robustness, long life, small size, largest possible proportions of end-on candlepower, minimum projection of centre of light source from cap of lamp, and absence of "pip." It will be noted that efficiency—as usually understood—in watts per candlepower is not mentioned in this list of desirable qualities. This may be thought strange, but when one considers the manner in which the sign lamp is fitted, it will be realised that it is radically different to the ordinary lamp burning indoors. It invariably burns on its side, it is carried on a metal structure fitted to an often vibrating ironwork, to the ordinary stresses of which have to be added the kicks of maintenance men when clambering over the sign. Nothing looks worse than a sign with a number of lamps missing, and the whole character of a letter may be changed by the omission of one or two essential lamps. It would seem that mechanical strength and electrical efficiency cannot well be combined in a lamp filament, and for that reason it is better to sacrifice the latter.

Colour.

There can be no doubt that the use of colour in an electrical display is a most important matter. In the early days the only means available for obtaining coloured light was the use of natural coloured glass lamps or of lacquer applied to clear glass bulbs. The former were extremely expensive and involved the carrying of large stocks, the latter were absolutely hopeless for permanent outdoor use, owing to the effects of weather. Of recent years the use of natural coloured glass hoods or caps which fit over a standard-sized lamp and are attached thereto by spring clips has largely become common. Besides providing an easy and convenient method of colouring—and changing colour—of a sign, the hood itself gives a large measure of protection from the weather.

The "cap" which fits over the end of the lamp only is useful where coloured backgrounds are employed, and the opal variety is extremely effective when used with small lettering to remove the otherwise inherent "spot of light" effect from the sign.

Quite a vogue has recently been established for the use of so-called Daylight Blue sign lamps. Vacuum lamps of 20 to 60 watts and gasfilled lamps of 30 to 40 watts have been used to emphasise the principal features of signs. The use of the ultra-brilliant gasfilled lamps in massed formation may be particularly appropriate in some installations, but the undue increase in light intensity is apt to furnish a very good weapon for the critics of electric signs without in any special degree adding to the publicity value of the display.

The latest development in the field of lamp colouring is the spray enamelled lamp. This process was evolved in America and the lamps are extensively used there. In this country very few signs have yet been completely equipped with colour sprayed lamps, and their behaviour will be watched with interest. The resulting effect of this process is very different from any lamp employing a clear coloured glass. Notwithstanding the claims of the lamp makers, it would undoubtedly appear that the enamel has a high absorption effect, and larger wattage lamps are certainly needed. While the entirely novel appearance may abundantly justify this additional expenditure in current, it must be borne in mind that it is not wise in every case to push up current consumption without very careful consideration.

Switchgear.

In an animated type of electric design the part played by the "Flasher" is of paramount importance. To obtain some of the more attractive effects, very involved controllers with scores of contact brushes have to be designed. The working out of switching effects determining the speeds of different portions of the mechanism, the accurate timing

of the various contact drums, and the design of the contact fingers, the current carrying electrical details, and the suitable mechanical construction only call for the work of the specialist. The fact that seldom is an electric sign seen to be operating faultily is a tribute to the thought which is built into the controlling switchgear.

We might well, at this point, consider the use of animation in electric signs. This motion might be divided into three headings :—

(1) Conventional movement.
(2) Reproduction of real movement.
(3) Motion for effect only.

In the first category we could include the spelling and sequence switching movements such as colour changing or the alternative lighting of various words or phrases. Signs in which letters apparently drift across a screen or in which monograms or groups of lamps are so controlled that different letters are formed should be included in the category. The consideration of these special types of signs deserve much more time than can here be afforded.

In the second class pouring wine, revolving wheels, rockets, flames, travelling locomotives, waving flags, dancing and juggling figures, and performing animals are included. This type of sign is only rendered possible by the characteristic of the metal filament lamps and their success may be gauged by the fact that nine people out of ten, when asked what signs they recall, inevitably mention those which contain an animated picture.

The third class exemplifies the fact that, other things being equal, a moving object will attract more attention than a still one. Moving borders, twinkling effects, geometric designs, expanding and contracting circles, are examples of this class, and nearly every advertiser demands that his sign is treated in this manner if he cannot appropriately introduce the reproduction of actual movement. Still or non-moving signs have lately been seen, but where they have succeeded it has either been because the medium employed is quite different, such as in the case of the Neon signs, or alternatively, where the sign by sheer mass dominates the area of vision, and thus dwarfs the other signs in the vicinity.

Restrictions.

In dealing with the fourth factor governing the development of electric signs, one treads on somewhat delicate ground. Much more thought has often to be expended in trying to overcome restrictions imposed by the archaic by-laws of local authorities in various cities, than in designing and erecting the actual sign.

There are cities in this country where signs may be erected on the roof tops without limit of any size but are not allowed to be fitted on the face of the building. Some cities will permit a projection of 12 inches without question, but the additional 2 to 3 inches that would enable a man to get behind a sign for maintenance purposes instead of compelling him to hang on to the front of the sign to the danger of passers-by, is absolutely forbidden. There are cities where you may fit a sign of any size or type, so long as it does not project beyond the kerb, others where, because an old by-law governing signs was drawn up in days of painted signboards, it is stipulated that a " continuous flat face " should be provided, and one has to fit a glass front to the letter. Another town will not permit a fixed sign, but allows a swinging one ; still another will refuse a box sign 6 inches deep, but permits one 24 inches from back to front. You may fix a sign with a plain stay in one town but not if you have any ornamental ironwork. In most towns the borough engineer or the building surveyor deals with electric signs matters, but one occasionally finds it necessary to make applications to the Chief of Police, the Chairman of the Watch Committee, the Licensing Justices, or the Inspector of Nuisances.

Truly, in these matters " the way of the transgressor is hard." In the Metropolis, where the by-laws are made by the Central Authority, they are administered by the Local Councils and the interpretation of the regulations varies in each district. It is undoubtedly essential that in the public interest some measure of control should be maintained over the erection of electric signs on public streets. What would seem to be desirable is that the various conflicting regulations should be scrapped and a unified set of by-laws

substituted. These, while reserving to the local authority the power to limit undue projection over the footway, and to ensure that the structure of the sign and the stability of the supporting building are safe beyond the possibility of doubt, should yet take cognisance of the natural development of electric signs and permit a standard practice to obtain throughout the Kingdom. If, too, it were possible to submit plans of proposed installations to the competent city official, and have same considered and accepted or rejected by him, instead of, as now, having to wait while committees consider, postpone, reconsider, report, ask confirmation, and indulge in their many circumlocutory schemes, it would be a great boon to the harassed sign designer, and oftentimes save months of vaxatious delay and lost opportunity.

Having now considered the factors governing the development of the electric sign, it might be well to regard the display itself as an advertising proposition, and set forth the essentials of its success. As in other forms of advertising, effective electrical displays call for :—

Attractive power, or the ability to give attention ;

Legibility, and clear definition in both wording and design ;

Selling power, to enable it to impress its message and make it endure.

Electric signs have two characteristics which tend to attraction and selling power, which are enjoyed by no other advertising medium. These are :—

1. Brightness.—Instinctively our eyes turn to the brightest object in view. There can be no more potent factor in arresting attention.

2. Animation.—The mystery, the fascination of simulated movement, the flowing of water, the revolving of wheels, the quick ascent of a rocket, all tend to a psychological effect that can only be capitalised in the flashing electric signs.

Other factors which are, perhaps, common to other forms of advertising but which can readily be embodied in an electric sign are :—

Originality. — The ability of being different, having distinctiveness and individuality.

Colour.—Which adds a charm and richness and appeals so strangely to the senses.

Design.—A characteristic border, for instance, identifies a sign, not only does it aid recognition, but it lifts it from its surroundings and increases the legibility.

Position.—The electric sign, invariably erected outdoors, largely free from conflicting influences, determines that not only must a great many people see it, but also that they must read it.

In conclusion, a few words on the important question of maintenance.

The large electric display owned, erected and controlled by the designer, rarely affords room for criticism on the score of its appearance. Unfortunately, the same is not true of the majority of those signs sold to advertisers and erected on their own premises. One finds lamps out, flasher operating badly, the whole sign a source of irritation rather than attraction. Some measure of blame is due to the purchaser, who refuses to accord to the electric sign the same degree of attention he willingly bestows on his shop-front, or his personal appearance, but a large measure of blame is often due to the sign seller.

There is a vast field for enterprise in electric sign designing and selling in this country. That business will not develop nationally unless the supplier realises that an electric sign is not merely an item of electrical merchandise, but that primarily what he has to sell is Advertising, and that the essential characteristics of this business is all summarised in the one word, SERVICE.

ELECTRIC SIGNS IN AMERICA.

According to a statement quoted in "The Year's Progress in Illumination," a report issued by the Illuminating Engineering Society (U.S.A.), the largest sign in the United States has letters 56·5 feet high and 10–12 feet wide. The outside dimensions of the structure are 153 feet by 75 feet. It is legible to the naked eye at 8 miles and visible at a distance of 30 miles.

THE USE OF LIGHT IN SHOPS, SHOW-WINDOWS, AND FOR DISPLAY PURPOSES.

By MISS M. PARTRIDGE, B.Sc.

(Introduction to a discussion before the Illuminating Engineering Society, held at the House of the Royal Society of Arts, 18, John Street, Adelphi, London, W.C., at 8 p.m., on Friday, March 21st, 1924.)

ELECTRICITY as an aid to advertising has been used in innumerable different ways, but few will contradict me when I assert that the very best and most paying form of advertising is, for the majority of shops, the well-dressed well-lighted shop window.

Though I am not afraid of contradiction, on the main point, I have frequently been surprised at the difference of opinion about what is a well-lighted shop window. I will take three instances that occur to me. Innumerable parallels will probably occur to everybody.

1. I was preparing a scheme for lighting a shop which had three nice low square show-windows. I outlined my ideas—concealed lighting from above the windows with holophane angle reflectors to flood the whole show space with light, but found I had run into a most emphatic set of prejudices. No—One large ornamental opal bowl fitting with elaborate brass chains was to hang low in the middle of each window. That would be an ornament to the window and an added attraction to the passer-by, and my hole and corner suggestion of hiding away electric lights where they could not be seen, it was implied, was only that of a contractor whose work would not bear too much public scrutiny.

The second is a very similar case. A shop we had tried to convert to concealed lighting. It is a sweet shop where the window is usually very well dressed, with the exception of the lights. These are many in number, and spotted all over the front of the window, and the shopkeeper's idea of making an attractive display is to give them different coloured paper shades each week to match with the general tone of the decorations.

The third case is that of the general electrician's shop window. I cannot at the moment recall any electrician's window really well-dressed and lighted. The majority show an overcrowded collection of fittings, and far too many of the fittings are lighted up.

What is good shop window lighting? It is far more easy to explain what it is not, than what it is. It is not a display of electric fittings, nor is it an ambitious effort to light the street, and most emphatically of all, it is not a collection of half-watt lamps dotted about inside the glass at about eye level.

Quite shortly, good window lighting is plenty of light from several points, all of which are concealed from the observer. I am not going to commit myself by saying how much "plenty of light" is, because it depends on a number of factors, and will vary from say ½ to 2 c.p. per cubic foot. Dark drapery and rough or velvety surfaces need more light than say a white linen display. Jewellery requires a more brilliant illumination than bacon.

A shop window with brilliantly lighted neighbours, needs more light than one in a comparatively dark street.

Londoners, in my experience, require more light than provincial townsfolk, and so on. Each case must be considered on its own merits and perhaps a certain amount of time must be spent in experiment on the case in question, but in each case the fundamental principles are:—

1. That the source of light must be concealed.
2. That there be sufficient sources of light to prevent irritating shadows must be strictly adhered to.

Perhaps there is one place where visible lamps are not a nuisance, and that is a well-known costume shop in Regent

Street, where the method employed is a very large number of comparatively low-powered obscured lamps (fullolite) all over the ceiling. This, of course, is only possible with a deep show case. Here the shop itself, irrespective of the contents, attracts attention, but I should like further evidence before being convinced of the advertising value of this method of drawing the public.

Another point in shop window lighting which merits attention and a certain amount of experiment is the colour of the light. Judiciously coloured light toning with the colour of the goods displayed adds enormously to the attractiveness of the window, and up to the present far too little attention has been paid to this form of advertising.

The shopkeeper, however, while paying attention to the outside of his shop should not be blind to the value of good lighting inside. There is nothing that annoys an irritable person more than having to decide whether an article is what he or she wants by an inadequate light, and the shopkeeper will certainly find his customer slow and difficult to please if his customer is either dazzled or annoyed by too little light or by irritating shadows.

All drapers ought to be urged to install colour matching lamps. It is surprising how few have found the value of these, chiefly, I think, because a room lighted only by daylight lamps makes customers look plain, but they are really a necessity, and I hope that soon customers will insist on seeing their things by white as well as by yellow light.

Other forms of advertising electric signs, electrically lighted posters and the floodlighting or concentrated constellations of light employed by places of amusement or large stores, all provoke considerable controversy. I have heard it said by many people that electric signs are vulgar and flamboyant, a sign of savagery, absurd, uncivilised, a desecration of our beautiful London buildings, almost profane and in execrable taste.

I must confess that after a torrent of this sort I was delighted to meet several people of refined and cultivated tastes who confessed to finding Piccadilly Circus at night an exciting and intoxicating experience. Of course, the ultra-æsthetic will put it down to a streak of degenerate savagery, but I shall be much surprised if several people do not own up to a similar streak of savagery in their composition. To what extent restrictions should be enforced with regard to electric signs, and to what extent any restrictions would be a genuine hindrance to trade, are important points not to be dealt with in a few minutes.

Undoubtedly electric signs should be subjected to restrictions if they either endanger the safety or health of the public, as they well may if they create dazzle or shock or distraction to drivers or horses in busy thoroughfares. They should also be controlled if it is proved that they are genuinely offensive to the majority. No one, I suppose, would be sorry to see conspicuous unscreened bright lamps in shop windows done away with. They only attract by their startling and dazzling ugliness, as painful to the eye as to the æsthetic sense, but the matter of the advertising sign is another matter. I am inclined to believe that some of the prejudice against electric signs in England may be accounted for by a certain racial objection to following an example set in America, and to a lesser degree in France.

It may be that we are not, as a race, temperamentally fitted to enjoy or profit by brilliant and startling electric displays. Certainly, the ordinary Englishman does not take his evening pleasures out of doors as the Frenchman does. He cannot, the weather won't let him, but I don't think I would go as far as to say that he does not enjoy what some people call flamboyance and savagery in the way of light.

However, we hope that many people will contribute to the controversy on the subject of whether the electric sign is or is not a breach of good taste and an offence to the general public.

There is one kind of electric sign which, on account of its comparative novelty, is worth a certain amount of description—The Neon Gas Sign. Gases in certain states of density are all more or less conductors of electricity, and when current is forced through a gas at sufficient current density, the gas becomes luminescent and shows some characteristic colour. This fact, well known to chemists

and often used as a laboratory test for gases, has found commercial application in the mercury vapour lamp and the Neon gas tube.

Neon gas is one of the lighter gases. It was discovered by Sir William Ramsay in 1896 and is found in the air of which it forms about ·0015 per cent.

A Frenchman, Mr. George Claude, invented an apparatus whereby, by use of liquid air, commercial quantities of Neon gas could be extracted from the atmosphere, and the first Neon sign was erected in Paris before the war and is still going strong.

In England there have not been Neon signs until recently, but since last year such places as the Coliseum, Palladium, the Shaftesbury Theatre and several shops have erected Neon signs, and probably London will soon have as many such signs as Paris itself.

The letters are as a rule constructed of 11-millimeter diameter tube, and the glass tube, often some 20 or 30 feet long, is twisted up into words.

Outline tubes, such as those up the pillars of the Coliseum and the great 10-ft. letters of Maples' sign are made of 30-millimeter glass tube.

The problems of construction and erection of Neon tubes are some of them quite tricky and interesting.

The gas, of course, must be got free from impurities or the colour is affected and the life of the tubes endangered. The true Neon incandescence is an intense red gold or flame colour, but tubes with impurities may be blue, lavender, pink, white or violet. I have seen them all these colours, and far be it from me to say how many other colours they can achieve. Handling the glass when erecting it on roof tops or shop fronts is another very difficult operation. Until it has been attempted it is impossible to appreciate how difficult this is, but perhaps it will give you some idea when you think that the words will not bear their own weight unless suspended from several points at the same time.

Yet another problem with the big Neon signs is the E.M.F. needed.

Neon gas is 630 times better conductor than air but it is over 80 million times the resistance of copper, so that a very definite number of volts are needed to push the current through 30 feet of tubing. 15,000 volts are used on quite an ordinary sign of from 10 to 20 letters and a little imagination will soon show you what that means in the way of insulation problems and protective devices required.

Slinging wires carrying 200,000 volts across open country is easy and straight forward work compared to bringing 10 or 15 thousand volts to a shop front without infringing either of the three conditions.

1. It must be efficiently insulated.

2. Cable connections must not be too conspicuous, and

3. The sign and all connections thereto must be inaccessible from any place where anyone is likely to reach.

There is no simple method of solution which will deal with any of these three problems. Every case must be worked out on its own merits.

Sometimes it is necessary to build a screwed up box over the transformer and connections, sometimes windows or doors have to be screwed up.

Occasionally bare wire may be slung from glass insulators or sometimes an elaborate system of glass tubes to carry the wire is called for.

After all this it will probably be asked, "Why install a Neon Sign at all?" Well, first I suppose, because the quality of the light emitted is of an intense and penetrating character, difficult to escape, one might call it almost vicious in its intensity, yet it is at a distance really a most attractive glow, to be seen miles away.

Secondly, the outline of the letters is clear and sharp however small the sign, and thirdly, as it is a very near solution of the old time problem of getting light without heat, the lighting efficiency is practically double that of the ordinary sign.

(At the conclusion of the paper a neon sign was exhibited by Messrs. Siemans and English Electric Co. Ltd., and visitors had an opportunity of studying the effect of the luminous lettering formed by the luminescent gas.)

DISCUSSION.

Mr. A. E. MOORE said that they had listened to two very interesting papers, and the authors had condensed into them, in the space of an hour, an amount of material which would require a long time to discuss. He would like to have further particulars of some of the devices described and illustrated which struck him as very effective from the advertising standpoint.

Mr. H. E. HUMPHREYS (Secretary of the incorporated Society of British Advertisers) referred to Mr. Garbett's remarks in regard to the rules and regulations governing outdoor advertising and electric signs. This was a subject which his Society had had before them for some time past and he hoped that the time was not far distant when they would be able to bring about some form of co-ordination between the various interests affected by these somewhat obsolete and varied regulations. It was much to be desired that some simplified regulations, applicable throughout the whole of the country, should be substituted.

Mr. R. A. IVES remarked that ½ to 2 candles per cubic foot had been suggested as desirable for the lighting of show-windows. He had adopted the same principle, working in terms of watts per cubic foot. He fully endorsed what had been said regarding avoidance of glare but would like to mention one somewhat difficult problem—the concealing of light sources with certain forms of windows, for instance those with three sides.

(Mr. Ives illustrated his remarks by a series of lantern slides, some showing good examples of show-window lighting, others effective illuminated signs, two views of which (Figs. 3 and 4), furnished by Benjamin Electric, Ltd., are shown on p. 49.)

In show-windows a certain amount of shadow was necessary to enable specific objects to "stand out," and in many cases very effective use could be made of colour; for instance certain objects might be brought into prominence by having more or less monochromatic light switched on to them. Windows varied very greatly in dimensions and much depended on the nature of the display and the method of dressing. It was, therefore, impracticable to attempt anything in the nature of a standard specification, and there was plenty of room for varied types of lighting fittings.

Mr. J. W. FIELD remarked that one of the chief modern features of show-window lighting was the use of some luminous device which enabled the name of the firm to be strikingly exhibited, besides directing light on the contents of the window. In this connection he exhibited a form of sign specially designed from this standpoint, and also illustrated his remarks by several lantern slides.

Mr. E. L. RANDALL heartily endorsed all that Miss Partridge had said with regard to the advertising value of well-lighted show-windows. There was, however, room for more precise definition of "a well lighted window." In regard to the use of colour a good effect was obtained by directing white light on to a figure already bathed in coloured light. This was preferable to the method of flooding a window with white light and having spots of colour, as the object to be brought out should be the brightest thing in the window.

Mr. T. E. RITCHIE said he would like to touch on two points, Flood Lighting and Hoarding Lighting. Both of these had been referred to by the Authors of the papers but in a manner that he felt was quite incompatible with their importance from the point of view of the efficient use of light for outdoor advertising. There were many interesting examples of floodlighting in and around London. One recently completed was, however, unique, being the only installation of its kind in the whole world. In this case the front of a very large, important and well-known London Store was illuminated by floodlight projectors which were equipped with high power gasfilled lamps and were tucked away beneath the ground, in vaults or cellars underneath the pavement; and those portions of the building which it

was desired to emphasise were illuminated in a very soft, delightful and effective manner. (Mr. Ritchie threw on the screen two slides illustrating this installation, which is shown in the accompanying illustration, Figs. 1 and 2, furnished by the Illuminating Engineering Dept. of the General Electric Co. Ltd.)

Fig. 2.—Showing illuminated panels in pavement adjacent to windows.

As regards poster lighting, the question would become of increasing importance as time went on. There were all kinds of considerations involved. It was not merely a question of taking a poster and hanging in front of it some kind of lighting device.

There were questions of psychology, colour, art, etc., and there was a very great deal of valuable and serious work which would have to be done, because advertisers were waking up to the fact that they wanted those methods which had a very much more extensive useful life than those which were only seen during the hours of daylight. An interesting psychological point appertaining to an illuminated hoarding was that it was usually seen when one was in a condition when its appeal was very much more forceful, that is to say when one had finished the day's business and was engaged in a quiet stroll or some kind of enjoyment.

Fig. 1.—Showing complete series of illuminated windows.

Miss Partridge had suggested that the illuminated poster was ten times as effective as the one that was not illuminated. He thought this an excessively modest estimate. Several large advertising firms in America had gone into this matter very exhaustively. They had had a number of large advertisement hoardings artificially lighted in one group of towns, and an equally large number unlighted in another group of similar towns. They had found the selling value of the illuminated posters was not merely ten times, but more like forty times greater than that of those which could only be seen to advantage during the hours of daylight.

He hoped that the Society, as the outcome of the meeting, would add to its

Fig. 3.—A near view of a window showing results obtained by concealed lighting.

Fig. 4.—An illuminated sign showing even distribution of light by reflectors above.

[Both views from night-photographs taken entirely by the artificial light used in the installations.]

many valuable works, by getting this question of poster lighting considered and dealt with in all its very important aspects. The combination and co-operation of Psychologists, Artists, Advertising Experts and Illuminating Engineers would, he felt convinced, do much to further the cause of both more pleasing and more potent efforts by the great advertisers of the country to the material advantage of all concerned.

Mr. E. A. MARX, JR., remarked that the illumination necessary in a show-window was a matter of contrast, and the illumination might vary, say from 10 to 40 foot-candles, according to the locality. In some shops there was a mirror at the back of the window. This had the drawback that direct reflections of the sources of light used to illuminate the contents of the window were seen. Reference has been made to the use of coloured light. There was no reason why, in addition, the colours should not be changed periodically by some automatic device, thus furnishing another attraction.

Mr. R. W. WHITEY said that the subject required to be considered from several different standpoints. Miss Partridge had referred to the objectionable nature of some signs. But he was not sure that, from the purely trading standpoint, the fact of a sign being irritating was a serious drawback so long as it attracted attention. People would not be deterred from purchasing an article because they objected to the manner in which it was brought to their notice.

Mr. J. W. T. WALSH inquired whether Mr. Garbett had any data on the relative life of gasfilled lamps used with flashing signs, as compared with that of lamps used for signs of constant brightness. He thought that it was generally understood that the life of a vacuum lamp was not affected by the number of times it was switched on, but he was not sure whether the same applied to gasfilled lamps. Possibly proprietors of signs might have information on this point which would be useful.

Mr. L. GASTER (Hon. Secretary), referring to Mr. Ritchie's remarks, said that the Council of the Society had under consideration the formation of a small sub-committee to deal in detail with the various problems arising in connection with illuminated signs. At present it was difficult to state exactly the conditions necessary for a successful sign, and it appeared desirable that the whole question should be studied from various aspects—that of the advertiser, the sign-manufacturer and the public. The Committee might also be able to do useful work in the direction of simplifying existing regulations for outdoor signs, a matter to which Mr. Garbett had made special reference.

Mr. P. J. WALDRAM, in proposing a vote of thanks to the readers of the two papers, said that he himself had formed a high opinion of women engineers during the war, and he was sure that members of the Society would extend to Miss Partridge a hearty welcome as a fellow-engineer. Miss Partridge had made effective reference to the objectionable nature of certain flashing signs; he felt that it was not sufficiently realised that it did not pay to annoy people by any form of advertisement. At present provincial towns were behind London in the beauty of their shop-fronts and the use of flood-lighting. He hoped that a stage would soon be reached when nobody would appreciate an irritating and tasteless form of sign, and he was sure that beautiful shop-fronts and the element of pleasure that one found in well conceived illuminated advertisements would sell more goods than any form of lighting that was merely blatant and powerful. The subject had been effectively put before the Society by two experts and he was sure that he might say, in the name of the audience, that they were very grateful to the lecturers.

Mr. L. E. BUCKELL (*communicated*):—The papers read by Mr. Garbett and Miss Partridge were both of great value, and the only serious criticism that one might make is that they gave us too much to consider in a single evening.

Notwithstanding the criticisms that have been made from the æsthetic standpoint it must be recognised that the illuminated sign has come to stay. We

should, therefore, concentrate attention on making it as good as possible from the point of view of those who utilise its advertising appeal. I think if anything Mr. Garbett understated the effect of the development of the modern lamp as a stimulant to the use of electric signs; it offers designers a variety as regards colour-effects and brilliancy, which was not available in the past. The essential point, now realised, is that a lamp intended for signs must differ in several respects from that adapted for general lighting purposes. I believe I am correct in saying that this country to-day is ahead of others in regard to the lamps available for signs.

It seems worth while emphasising the variety of means by which colour-effects can be secured—and also the fact that there is no " best " way of getting colour. Much depends on the size and design of the sign and especially on the distance from which it is to be viewed. Daylight blue lamps, lamps in which colour is obtained by hoods or caps of coloured glass, all give quite different results.

In the case of signs giving the effect of movement, the important thing is for the designer to keep in mind what story the sign is intended to tell. As a rule the movement does not tell the story, but merely attracts attention to the sign. Hence the story should come out in some contrasting colour, and should remain visible long enough to be easily read. There are some signs which involve great mental ability in order to get the story; in one case one could not see a whole word depicted without standing and watching the sign for a considerable time.

I should like to ask Mr. Garbett's views on the use of illuminated signs adjacent to main railway routes, as it appears that these are not used as frequently as they should be. There is a sign in Durham apparently quite half-a-mile from the railway, but so placed that every traveller up and down the main Scotch route saw it as a sort of landmark. Probably there would, in such cases, be few of the restrictions which prove so troublesome in big towns.

In conclusion I would like to endorse Mr. Garbett's comment on the importance of maintenance of electric signs being undertaken by a responsible firm. Failure of a sign to achieve its object has frequently been due to the sign being allowed to become dirty and untidy, owing to mistaken economy in the use of lamps. Surely it is at least as important for a sign representing a large firm to be smart and tidy as for their staff or offices to be so!

Mr. G. P. GARBETT, in reply said, that he had no information on the point raised by Mr. Walsh. His impression, however, was that the life of the gas-filled lamp was not affected by flashing any more than the vacuum lamp. There were certain problems met with in connection with the use of gasfilled lamps, but they were not connected with the effect of flashing. Mr. Ritchie's comments had been very interesting. He (Mr. Garbett) was strongly in favour of the method of lighting posters by hidden sources, and no one had tried more—or failed more—with different forms of reflectors to get good effects under somewhat difficult conditions. But at present, except in a few instances, he had found it difficult to induce advertisers to make much use of the illuminated poster.

Miss M. PARTRIDGE, in a brief reply, said that she had nothing to add to the remarks of the various speakers, some of which had been most illuminating and suggestive.

THE FORMATION OF AN ILLUMINATING ENGINEERING SOCIETY IN AUSTRIA.

THE inaugural meeting of the newly-formed Illuminating Engineering Society in Austria took place on April 8th, in the Lecture Theatre of the Techniscle Hochshule, in Vienna. After the conclusion of formal business, including the adoption of the statutes and election of Council, an address was given by Mr. Heyck, of Leipsic, on Interior Lighting and Problems involved therein.

At the present time, therefore, there are in existence Illuminating Engineering Societies in England, the United States, Japan, Germany and Austria Hungary, and no doubt similar bodies will be formed in other countries in due course.

NATIONAL ILLUMINATION COMMITTEE OF GREAT BRITAIN.

(Affiliated to the International Commission on Illumination.)

Constituted by the co-operation of:—
THE ILLUMINATING ENGINEERING SOCIETY.
THE INSTITUTION OF ELECTRICAL ENGINEERS.
THE INSTITUTION OF GAS ENGINEERS.
THE NATIONAL PHYSICAL LABORATORY.

Representatives nominated to serve on the Committee for the year 1924:—

H. BUCKLEY (a)
W. J. A. BUTTERFIELD (c)
J. G. CLARK (c)
W. C. CLINTON (b)
HAROLD G. COLMAN (c)
KENELM EDGCUMBE (b)
LEON GASTER (a)
PERCY GOOD (b)
F. W. GOODENOUGH (c)
HAYDN T. HARRISON (b)
JAMES KERR (a)
J. T. MACGREGOR-MORRIS (b)
CLIFFORD C. PATERSON (a)
SIR JOSEPH E. PETAVEL (d)
A. P. TROTTER (a)
J. W. T. WALSH (d)
ROBERT WATSON (c)

(a) Nominated by the Illuminating Engineering Society.
(b) Nominated by the Institution of Electrical Engineers.
(c) Nominated by the Institution of Gas Engineers.
(d) Nominated by the National Physical Laboratory.

The Committee has made the following appointments:—

Representatives of Great Britain on the Executive Committee of the International Commission on Illumination:—

LEON GASTER and ROBERT WATSON.

OFFICERS:

Chairman: LT.-COL. KENELM EDGCUMBE.

Vice-Chairmen: CLIFFORD C. PATERSON and ROBERT WATSON.

Treasurer: W. J. A. BUTTERFIELD, 66, Victoria Street, London, S.W.1.

Secretary: H. BUCKLEY, The National Physical Laboratory, Teddington, Middlesex.

NATIONAL ILLUMINATION COMMITTEE OF GREAT BRITAIN.

Report of the Chairman for the year 1923, presented to the Special Annual Meeting of the Committee held on the 5th February, 1924.

IT was with deep regret that the Committee learned of the death of Monsieur J. Violle on the 12th September, 1923. His work on the platinum standard of light and his association with the French National Committee on Illumination as its honorary president cause his loss to be deplored by members of the British National Committee in common with the whole of the scientific world.

In view of the large amount of standardisation which appeared likely to require attention in the near future, the British National Committee, with the approval of the constituent societies, suggested to the British Engineering Standards Association the formation of a Sectional Committee on Illumination, to which such matters could be referred. The Association expressed itself as favourably disposed towards the proposal, but desired, before arriving at a decision, to summon a conference of representatives from various organisations likely to be interested.

At this Conference, to which delegates representing some twenty different bodies were invited, a resolution was passed, unanimously requesting the British Engineering Standards Association to form such a committee. In response to this request, the Association has signified its intention of establishing a Sectional Committee on Illumination, of which the National Illumination Committee of Great Britain will form the nucleus. Lt.-Col. K. Edgcumbe has been appointed Chairman, and the exact composition of the Committee is now under consideration.

It is hoped that the formation of this Committee, by bringing together the technical and industrial interests, will not only accelerate standardisation in Illumination matters in this country, but will also enable the representatives of the British National Illumination Committee, when attending meetings of the International Commission, to speak with an authority, which has not, in the past been possible, representing, as they do, the purely technical side of the industry.

The Sub-Committee on Headlights has pursued its investigations during the year in carrying out the proposed comparison between the recommendations of various countries. The Committee at once experienced a difficulty, owing to the very different bases of comparison which have been adopted. For example, the American requirements are based upon candlepower, whereas the British are throughout expressed in terms of the visibility of the "standard disc." It was necessary, therefore, before any progress could be made, to establish a relationship between the visibility of the disc at different distances and the illumination necessary to produce that visibility. With the assistance of the National Physical Laboratory this relationship has been established with fair certainty, so that it is now for the first time possible to compare the British and American proposals on a common basis.

Another difficulty lay in obtaining a headlight, which, even when fitted with American moulded front glasses, would give a beam complying with the American Specification. Thanks to the good offices of Dr. Clayton Sharp, the Chairman of the National Illumination Committee of the United States, this difficulty has been surmounted, and the Headlights Sub-Committee hope shortly to be in a position to obtain a comparison between headlights constructed in accordance with each proposal, from the point of view both of freedom from glare and of efficiency as driving lights.

A number of meetings of the Definitions and Symbols Sub-Committee have been held during the year. As a result, some modifications in the definitions issued in the 1921 report are under

consideration by the National Committee, and it is hoped that the British delegates to the next meeting of the International Commission will be in a position to put forward certain concrete proposals for consideration.

At the meeting of the International Illumination Commission held in Paris in 1921, it was provisionally decided that the next meeting of the Commission should be held in the United States in 1924. In view, however, of present conditions, it seemed to the Executive Committee of the Commission that it would be difficult to ensure a really representative attendance of delegates at so great a distance. Accordingly the members of the United States Committee, whilst courteously expressing their regret that they would thereby be prevented from welcoming the delegates to the United States, at once acquiesced in the proposal that the next meeting of the Commission should be held in Switzerland. This will accordingly take place at Geneva, from the 21st to the 25th July, 1924.

K. EDGCUMBE.
Chairman.

THE FIRST INTERNATIONAL MEETING FOR THE STUDY OF PROBLEMS OF INDUSTRIAL HYGIENE.

AT the First International Meeting for the Study of Industrial Hygiene, to be held in Geneva during July 18th to 20th this year, a number of interesting points are to be discussed, including: (1) Industrial Lighting and Eye-strain; (2) Impure Air in Factories; and (3) The Value of Fatigue Tests. The headquarters of the Organising Committee, presided over by Dr. Christiani, Scientific Director of the Cantonal Health Department, are the Institute of Hygiene at the University of Geneva. The reports to be presented include a contribution from Mr. L. Gaster on Industrial Lighting, and from Dr. Stassen, of Liege, on the Eyesight of Miners (which is regarded as being closely associated with the conditions of illumination in mines).

The gathering should afford a good opportunity of reviewing progress in industrial lighting in various countries in relation to hygiene. It is hoped that a number of delegates to the meeting of the International Illumination Commission, immediately following this Conference in Geneva, will be able to attend.

BRITISH EMPIRE EXHIBITION.

EXHIBITS OF THE NATIONAL PHYSICAL LABORATORY.

WE understand that the National Physical Laboratory is exhibiting in three distinct sections at the Exhibition, namely, the British Engineers' Association Section (Palace of Engineering), the Royal Society Section (H.M. Government Pavilion), and the Association of British Chemical Manufacturers (Palace of Industry). Demonstrators on the stand at the Palace of Engineering are authorised to provide visitors with permits to visit the National Physical Laboratory, which are arranged to take place on Wednesdays or Saturday afternoons.

E.D.A. EXHIBITS.

An illustrated booklet entitled "Electricity in Service," issued by the British Electrical Development Association, describes the E.D.A. exhibits as an educational, non-trading display of great general interest. In the Palace of Engineering the uses of electricity in the home and in business are illustrated, and in H.M. Government Building there is an exhibit of the application of electricity on the farm.

TOPICAL AND INDUSTRIAL SECTION.

[At the request of many of our readers we have extended the space devoted to this Section, and are open to receive for publication particulars of interesting installations, new developments in lamps, fixtures, and all kinds of apparatus connected with illumination.

The contents of these pages, in which is included information supplied by the makers, will, it is hoped, serve as a guide to recent commercial developments, and we welcome the receipt of all *bona-fide* information relating thereto.]

RECENT ILLUMINATED SIGNS.

FROM the General Electric Co., Ltd., we receive particulars of several recently installed illuminated signs, notably for kinema work. The adjacent illustration shows the new sign used to announce the film "The Ten Commandments" at the Pavilion in Piccadilly Circus, which is stated to use 4,610 Osram colour-sprayed lamps in red, green and amber. In addition 1,100 similar lamps are used for the border of a second sign on the Shaftesbury Avenue frontage of the Pavilion. For the sign approximately 200 k.w. of energy is used.

A large sign recently installed outside the Pavilion (Piccadilly Circus).

An instance of a different method is to be found in the illuminated hoardings outside the Tivoli Theatre, London, for which two Osram 500-watt gasfilled lamps equipped with the special "Wembley" reflectors are used. It is stated that the energy used for this sign amounts to 4·5 watts per sq. ft. of area illuminated, which is not considered too high for a well-lighted thoroughfare such as the Strand; no doubt in districts where there is less general illumination a much smaller consumption would suffice.

We understand that Municipal Supply Authorities are encouraging hoarding lighting which furnishes a useful load at a time when the industrial load is diminishing. Accordingly in some districts special rates have been offered—in some cases as low as 2d. per unit—for lighting of this kind, which forms a very economical and effective advertisement.

THE ARTIFICIAL LIGHTING OF A FOOTBALL FIELD.

AN interesting and highly successful experiment has recently been carried out in connection with the artificial lighting of a football field by electric lamps, by Messrs. Siemens & English Electric Lamp Co., Ltd., from whom we have received the illustrations and information embodied in this note.

The installation, which was designed by the Illuminating Engineering Departments of Siemens & English Electric Lamp Co., Ltd., and the Benjamin Electric Company in collaboration, was erected on the Burnley Cricket Club ground at Burnley, Lancs., for a night match between Dick Kerr Ladies (Lancashire Champion) and Hey's Ladies (Yorkshire Champion). It consisted of Benjamin Reflectors used in conjunction with Siemens 1,500-watt and 500-watt gasfilled lamps, the arrangement being as follows:

Fig. 1.—One of the special reflectors used to illuminate the football field.

Eleven 30 ft. wooden poles were erected (26 ft. above the ground) along either side spaced 33 ft. apart, and four similar poles along either end.

The side poles carried Benjamin Angle parabolic reflectors mounted at the top and fitted with 1,500-watt Siemens gasfilled lamps, 5 ft. lower down Benjamin Elliptical Angle Reflector with 500-watt Siemens gasfilled lamps.

The end posts had Benjamin Concentrating type reflectors with 1,500-watt lamps, mounted at the extreme top.

The arrangement resulted in very good illumination to the value of 7 foot-candles all along the touch line, 2½ foot-candles 30 ft. in from the posts, 2 foot-candles 60 ft. in, and 0·5 foot-candles in the centre of the field of play. The top reflectors were above the line of vision and the lamps and the reflecting surfaces of the Elliptical Angle Reflectors were invisible to the players. The concentrating reflectors at either end of the field also lit up the goals and corners without appreciable glare.

The players though slightly handicapped by a fall of snow, which started just before the match and continued right through the game, unanimously expressed approval of the effect of the lighting on their play. A feature being the absence of inconvenient shadows.

The apparent success of the whole arrangement shows the possibilities of the use of artificial light in this field, and we may therefore hope to witness league football matches under similar conditions.

BENJAMIN REFLECTORS.

IMPORTANT PRICE REDUCTIONS.

Considerable price reductions have recently been announced by Benjamin Electric, Ltd., in many cases amounting to 20–30 per cent. In addition a number of lines have been cancelled in order to make way for new and improved designs. A new interim catalogue containing all these modifications is in course of preparation.

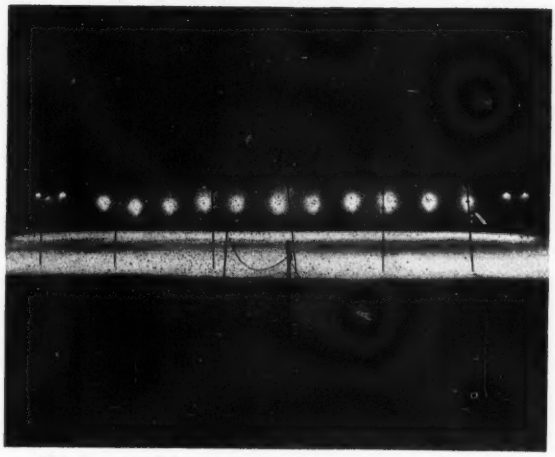


Fig. 2.—Showing arrangement of sources round the field.

Fig. 3.—The two teams standing on the illuminated ground.

THE ARTIFICIAL LIGHTING OF A FOOTBALL FIELD.

Fig. 4.—Another view showing positions of lights at the side, behind the touchline.

Fig. 5.—Play in progress by artificial light.

THE ARTIFICIAL LIGHTING OF A FOOTBALL FIELD.

INDEX, April, 1924.

	PAGE
British Empire Exhibition, Exhibits at the	54
EDITORIAL. By L. GASTER	33
Illuminating Engineering Society— (Founded in London, 1909)	
Account of Meeting on March 21st, 1924	37
New Members	37
The Use of Light for Outdoor Advertisements. By G. P. GARBETT	38
The Use of Light in Shops, Show-windows, and for Display Purposes. By Miss M. PARTRIDGE, B.Sc.	44
Discussion—A. E. MOORE—H. E. HUMPHREYS—R. A. IVES—J. W. FIELD—E. L. RANDALL—T. E. RITCHIE—E. A. MARX, JR.—R. W. WHITEY—J. W. T. WALSH—L. GASTER—P. J. WALDRAM—L. E. BUCKELL	47
Illuminating Engineering Society in Austria, The Formation of a	51
International Meeting for the Study of Problems of Industrial Hygiene, The First	54
National Illumination Committee of Great Britain, Chairman's Report for 1923	53
TOPICAL AND INDUSTRIAL SECTION	55

GAS AT WEMBLEY.

IN our last issue reference was made to the lighting by gas of the Amusement Park at the British Empire Exhibition. While the electric lighting of the other sections of the Exhibition presents many interesting features, the gas lighting is, by large two-lamp and four-lamp standards, also on a considerable scale. Each lamp contains sixteen mantles and there are usually two lamps to the column. Each lamp is stated to furnish 600 candlepower, and the columns are 60 feet apart and 35 feet apart across the roads. In all there are nearly two miles of road lighting by gas and it is estimated that the lamps together furnish more than 500,000 candlepower. To effect this over twelve miles of gas mains have been laid within and without the grounds and something like ¾ million cub. feet of gas per day is being used for illumination, and for cooking and heating in the restaurants, as well as for special purposes in connection with various exhibits.

DISSOLVED ACETYLENE.

A VERY complete series of lists illustrating the uses of dissolved acetylene has been issued by Messrs. Allen Liversedge, Ltd. The whole process of storing acetylene in cylinders is described and illustrated and its uses for emergency lighting, welding and cutting operations, brazing, etc., are explained. (In passing we may note one novel and interesting application—the use of the flame to destroy "dry-rot" fungus in brick.)

Another important application is in connection with motor-cycle equipment. Here the oxy-acetylene flame brings a pastille of rare earths to incandescence and a continuous point-source, very valuable for a projection of an even beam, is secured. It is stated that the gas consumption of a Fallolite lamp, utilising this process, is only one third of that of any ordinary acetylene lamp, and it is claimed that as the incandescent surface of the pastille faces the mirror, there is a minimum of dazzle—a point of great consequence at the present time.

MINER'S LAMPS.

WE are informed that the Thor Electric Safety Lamp Co., Ltd., is putting on the market a special form of "Dioptric" wellglass, which is stated to give two to three times the illumination yielded through an ordinary wellglass, at the same time reducing the brightness of the source, thus reducing the tendency to eyestrain.

We understand that the Ceag Electric Safety Lamp has been selected for installation in the lamp cabin at the Ideal Colliery at the British Empire Exhibition.

TEMPERATURE-MEASURING INSTRUMENTS.

A LITTLE booklet issued by the Cambridge Scientific Instrument Co., Ltd., contains a useful review of temperature-measuring instruments, in which there have been marked improvements during recent years. Special interest attaches to the dial thermometers, suitable for use in positions where the ordinary instrument would be difficult to read. It is stated that these have proved very serviceable for measuring the temperature of radiators on motor cars. There are also thermographs, "distance thermometers," *i.e.*, instruments giving a reading visible a considerable distance away, and pyrometers in great variety including some of the optical type, while a final section gives particulars of apparatus for automatic temperature-control, which should have many useful applications.

"EVERYDAY" ELECTRIC FITTINGS.

A LEAFLET under the above title has been issued by Messrs. Smith and Ansell of Birmingham, which contains particulars of inexpensive fittings. Mains extensions to-day are largely in districts inhabited by people of moderate means. There should therefore be a demand for fittings at reasonable prices—provided the quality of materials and workmanship are good, as is claimed to be the case. Each fitting is packed in tissue and cardboard boxes, the material virtually going direct from factory to user.

REVIEWS OF BOOKS AND PUBLICATIONS RECEIVED.

Institution of Gas Engineers, Transactions for 1922–23.

The bound volume of the transactions of the Institution of Gas Engineers for the previous session is, as usual, a well-got-up and comprehensive publication, containing an account of a great deal of useful work. Special importance attaches to the reports of the Research Committee and the Gas Investigation Committee, and to the discussion on Education in the Gas Industry. The only addition that one would like to see in future editions is some fuller reference to problems involved in lighting by gas, on which much valuable work remains to be done.

The Practical Electrician's Pocket Book (S. Rentell & Co., Ltd., London, pp. 570 *3s. net).*

The twenty-sixth edition of the Practical Electrician's Pocket Book, now available, appears to be well up to the standard of its predecessors and has been fully revised and brought up-to-date. The chapter on wiring systems is now most comprehensive, and recent additions include a section on wireless broadcasting. We notice that a return has been made to pre-war binding. There are useful sections on lamps, lighting and photometry. Altogether the pocket book presents a great deal of useful information in a compact form and at a very moderate price, in view of the greatly increased printing costs since the war.

We also take this opportunity of mentioning that Messrs. S. Rentell & Co. have arranged a stand, devoted to "Electricity" and other publications, in the Palace of Engineering, where visitors will be cordially welcome.

The Journal of the Municipal College of Technology, Manchester (Vol. 11, 1924).

The last volume of this publication contains a record of researches in engineering and chemistry, etc., conducted in the college. It is hoped in future to publish the volume annually. The journal is excellently got up and does credit to the Department of Printing and Photographic Technology by whom it was issued.